(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(54) Title: METHOD FOR SEPARATING MULTIPLE HOME NETWORKS
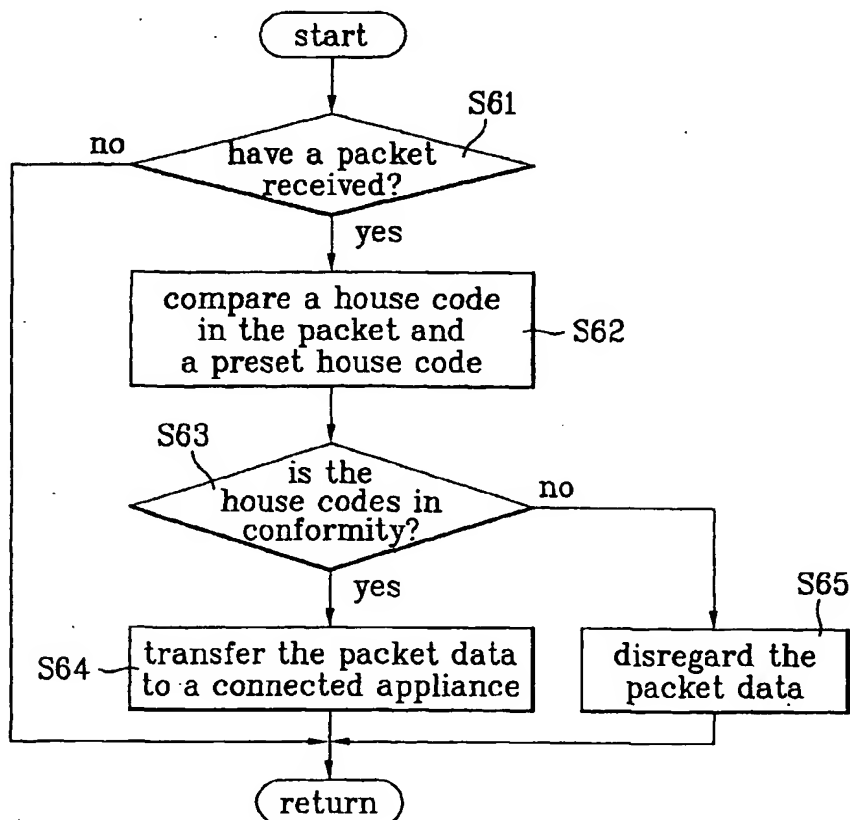
(57) Abstract: A method for separating multiple home networks sharing a communication line path is disclosed. The method includes a step for setting a house code so as to divide each home network according to adaptors of each product; a step in which each adaptor receives a packet once a predetermined packet including the house code is transmitted to the communication line path, and then the predetermined house code and a house code included in the packet are compared; and a step in which a corresponding adaptor recognizes as a packet transmitted to itself if the house code is consistent as a result of the comparison, and then transmits a corresponding packet to a product connected to itself.

WO 03/084143 A1

(84) **Designated States** *(regional):* ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

METHOD FOR SEPARATING MULTIPLE HOME NETWORKS

Technical Field

The present invention relates to a home network system, and more

5   particularly, to a method for identifying multiple home networks sharing a

communication line.

Background Art

Currently, the home automation almost comes to a stage to put into practical

use, in which home appliances are controlled automatically in a home or far from the

10   home. Though an initial home automation is at a level the appliances are controlled

separately by using a telephone line or an infrared ray, without interconnection

between the appliances, currently a method is used, in which a network of the

appliances are constructed by employing communication means, and a controller for

controlling the network is provided, for integrated management of the network.

15   The home network may be constructed by using an exclusive communication

line for each home, or multiple home networks may be constructed by using a power

line or a common communication line like a radio communication.

In a case the home networks sharing the communication line are to be

constructed, a technology for exact identification of a home network for each home is

20   absolutely required for making reliable and effective communication within entire

network.

Presently, related art home networks sharing the communication line are under development, up to a stage to construct a conceptual system merely, but without practical application to each home, with the homes identified effectively.

5   Disclosure of Invention

An object of the present invention designed for solving the foregoing problem lies on providing a method for identifying multiple home networks, in which each home network can be identified exactly, for making an effective communication.

10   These and other objects of the present invention can be achieved by providing a method for identifying multiple home networks including the steps of setting a house code to each of adapters to the home appliances for identifying home networks, receiving a packet including the house code on the communication line at the adapters, and comparing a preset house code to the house code included in the

15   packet, and one of the adapters understanding that the packet is directed to the one of the adapters if the two house codes are in conformity as a result of the comparison, and transferring the packet to one of the home appliances connected thereto.

Brief Description of Drawings

The accompanying drawings, which are included to provide a further

understanding of the invention, illustrate embodiments of the invention and together

with the description serve to explain the principles of the invention:

In the drawings:

FIG. 1 illustrates a layout of home networks sharing a communication line in

5   accordance with a preferred embodiment of the present invention;

FIG. 2 illustrates a block diagram of a detail system of the appliances and the

power line communication adapters in FIG. 1;

FIGS. 3A – 3C illustrate structures of communication packets transmitted in

FIG. 1;

10   FIG. 4 illustrates a flow chart showing the steps of a method for setting a code

for identifying multiple home networks of the present invention;

FIGS. 5A – 5C illustrate structures of communication packets transmitted in

FIG. 4; and

FIG. 6 illustrates a flow chart showing the steps of a method for identifying

15   multiple home networks in accordance with a preferred embodiment of the

present invention.

Best Mode for Carrying Out the Invention

Reference will now be made in detail to the preferred embodiments of the

present invention, examples of which are illustrated in the accompanying drawings.

20   In explaining the embodiments, the same names and reference symbols will be given

to the same parts, and iterative description of the parts will be omitted.

FIG. 1 illustrates a layout of home networks sharing a communication line in accordance with a preferred embodiment of the present invention, FIG. 2 illustrates a block diagram of a detail system of the appliances and the power line communication

5   adapters in FIG. 1, FIGS. 3A – 3C illustrate structures of communication packets transmitted in FIG. 1, FIG. 4 illustrates a flow chart showing the steps of a method for setting a code for identifying multiple home networks of the present invention, FIGS. 5A – 5C illustrate structures of communication packets transmitted in FIG. 4, and FIG. 6 illustrates a flow chart showing the steps of a method for identifying multiple

10   home networks in accordance with a preferred embodiment of the present invention.

There are home network systems sharing a communication line of a power line of the present invention illustrated in FIG. 1.

That is, a home 'A' and a home 'B' have home networks constructed respectively to share a communication line of a power line, with home appliances 10

15   in each of the homes connected to the power line through a power line communication adapters 20. A PC 30 in each home serves as a controller for controlling the network.

A detailed system of FIG. 1 is illustrated in FIG. 2.

That is, each appliance 10 includes a non-volatile memory 11, a

microcomputer 12 for operation of the appliance and communication control, a serial

communication port 14 for transmission/reception of data, and each of the adapters 20

includes a non-volatile memory 21, a serial communication port 22 for

communication with the serial communication port 14 of the appliance 10, a

5   communication circuit 23, a communication control microcomputer 24, and a power

line communication module 25 for enabling data communication through the power

line. The serial communication port 14 of each of the appliances 10 and the serial

communication port 22 of the adapter 20 are connected, and the power line

communication module 25 of each of the adapters 20 is connected to the power line.

10   Structures of transmission packets of the appliances of the foregoing

home networks are illustrated in FIGS. 3A – 3C. Referring to FIG. 3A, a transmission

packet from the appliance 10 to the adapter 20 includes an 'STX (starting code)', 'a

receiver address', 'message to be transmitted', a 'CRC' (an error check code), and

'ETX (termination code)'. Referring to FIG. 3B, a transmission packet from the

15   adapter 20 to the power line includes a 'house code', an 'STX', a 'receiver address', a

'transmitter address', a 'message to be transmitted', a 'CRC', and an 'ETX'.

Referring to FIG. 3C, a transmission packet from the adapter 20 to the appliance 10

includes an 'STX', a 'receiver address', a 'transmitter address', a 'message to be

transmitted', a 'CRC', and an 'ETX'. That is, the 'house code' is added only when a

-6-

transmission is made through the power line.

At first, it is required that a method for identifying multiple home networks of the present invention is started from setting a house code to each of adapters 20 for identifying respective homes. Accordingly, the house code setting will be explained

5   in detail, with reference to FIG. 4.

A user or a service man from a manufacturer connects the adapter 20 to an appliance 10 (S41).

Then, a program for setting a house code is put into operation in a PC 30 (S42). The program may be downloaded through Internet, or provided in a form of a

10   CD or a diskette.

A serial number of the user fitted adapter 200 is provided to the operative program for setting a house code (S43).

Then, when the serial number is provided, the program for setting a house code makes an automatic access to a house code managing site (S44).

15   Then, the accessed house code managing site assigns its own house code not in use at the present time, and transfers to the PC 30 (S45).

Then, referring to FIG. 5A, the house code setting program in the PC 30 constructs a packet including 'a receiver adapter serial number' defining a receiver address, 'a PC network address' defining a transmitter address, and 'the house code'

-7-

assigned from the managing site. (S46).

Then, the house code setting program transfers the packet to the adapter 20 (S47).

Then, reception of 'ACK' from the adapter 20 is determined (S48), and a

5   determination that the house code setting is finished is made and the process is

terminated if the 'ACK' is received, or the transfer of the packet is repeated if no

'ACK' is received.

In this instance, upon reception of the packet as shown in FIG. 5A, the

adapter 20 responds with a packet constructed to include 'a PC network address'

10   defining a receiver address, 'a receiver adapter serial number' defining a transmitter

address, and the 'ACK' as shown in FIG. 5B.

In the meantime, a method for identifying respective home networks in

transmission of the packet after finishing the house code setting as shown in FIG. 4

will be explained, with reference to FIG. 6.

15   Each of the adapters 20 determines if a packet is received through a power

line (S61). If the packet is received as a result of the determination (S61), each of the

adapters 20 compares the house code in the packet to the house code set in the setting

of the house code (S62).

Then, conformity of the house codes is determined (S63) as a result of the

comparison (S62), and the packet is transferred to a connected appliance 20 if the

house codes are in conformity (S64).

Opposite to this, if the house codes are not in conformity as the result of the

determination (S63), the packet is disregarded (S65).

5   Eventually, if a packet is transmitted through a common communication line,

a power line, only a relevant appliance receives the packet, decodes to carry out a

required operation order, without giving influence to other appliances.

It will be apparent to those skilled in the art that various modifications and

variations can be made in the method for identifying multiple home networks of the

10   present invention without departing from the spirit or scope of the invention.   Thus,

it is intended that the present invention cover the modifications and variations of this

invention provided they come within the scope of the appended claims and their

equivalents.

Industrial Applicability

15   The method for identifying multiple home networks having a common

communication line can identify a home network in multiple home networks having

a common communication line effectively by a simple setting and an algorithm

addition without additional hardware, whereby permitting to make an efficient and

reliable communication.

What is Claimed is:

1. A method for identifying multiple home networks each having a plurality

of home appliances connected to respective adapters and a network controller, and at

least two home networks share one communication line, the method comprising the

5   steps of:

setting a house code to each of adapters to the home appliances for

identifying home networks;

receiving a packet including the house code on the communication line at the

adapters, and comparing a preset house code to the house code included in the packet;

10   and

one of the adapters understanding that the packet is directed to the one of the

adapters if the two house codes are in conformity as a result of the comparison, and

transferring the packet to one of the home appliances connected thereto.

15   2. A method as claimed in claim 1, wherein the step of setting a house code

includes the step of;

putting a house code setting program into operation in the network controller,

providing a serial number of the adapter and making access to a house code

managing site on the Internet in the program,

-10-

receiving an own house code assigned from the house code managing site

and transferring to a relevant adapter, and

the adapter storing the house code to a relevant memory region.

5   3. A method as claimed in claim 2, wherein the step of providing a serial

number of the adapter and making access to a house code managing site on the

Internet in the program includes the step of making an automatic access to the house

code managing site once the serial number for the adapter is provided.

10   4. A method as claimed in claim 1, further comprising the step of the adapters

disregarding the received packet if the two house codes are not in conformity as the

result of comparison.

15

20

FIG. 1
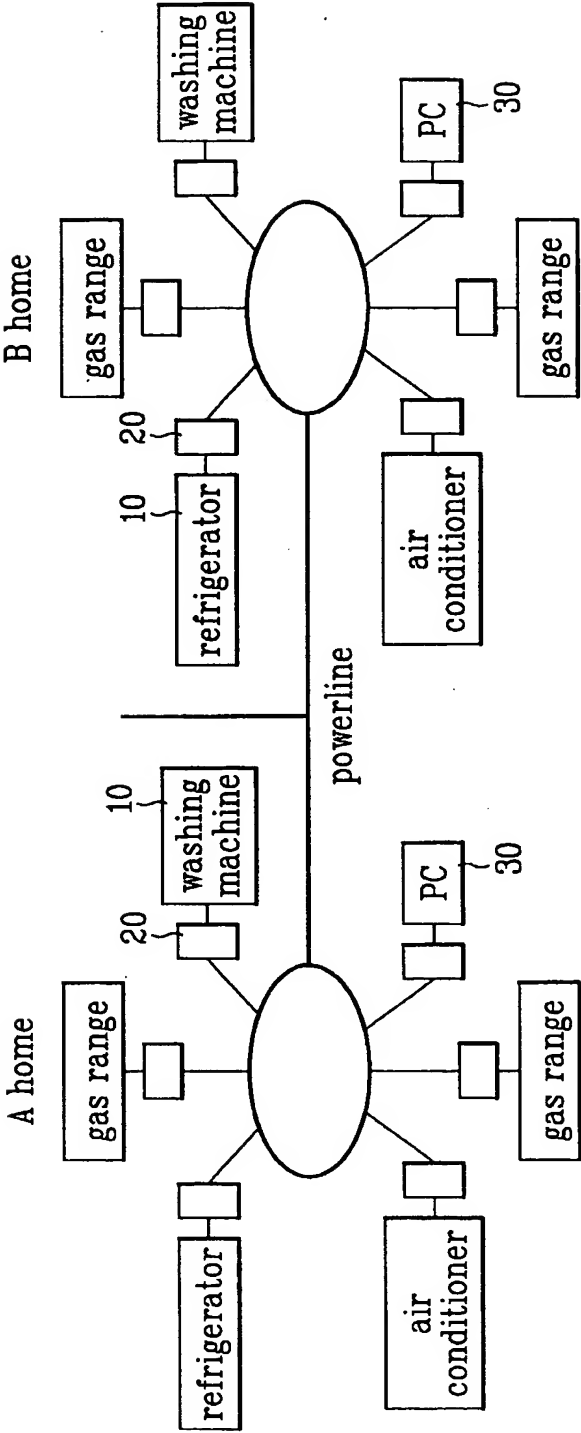
FIG. 2
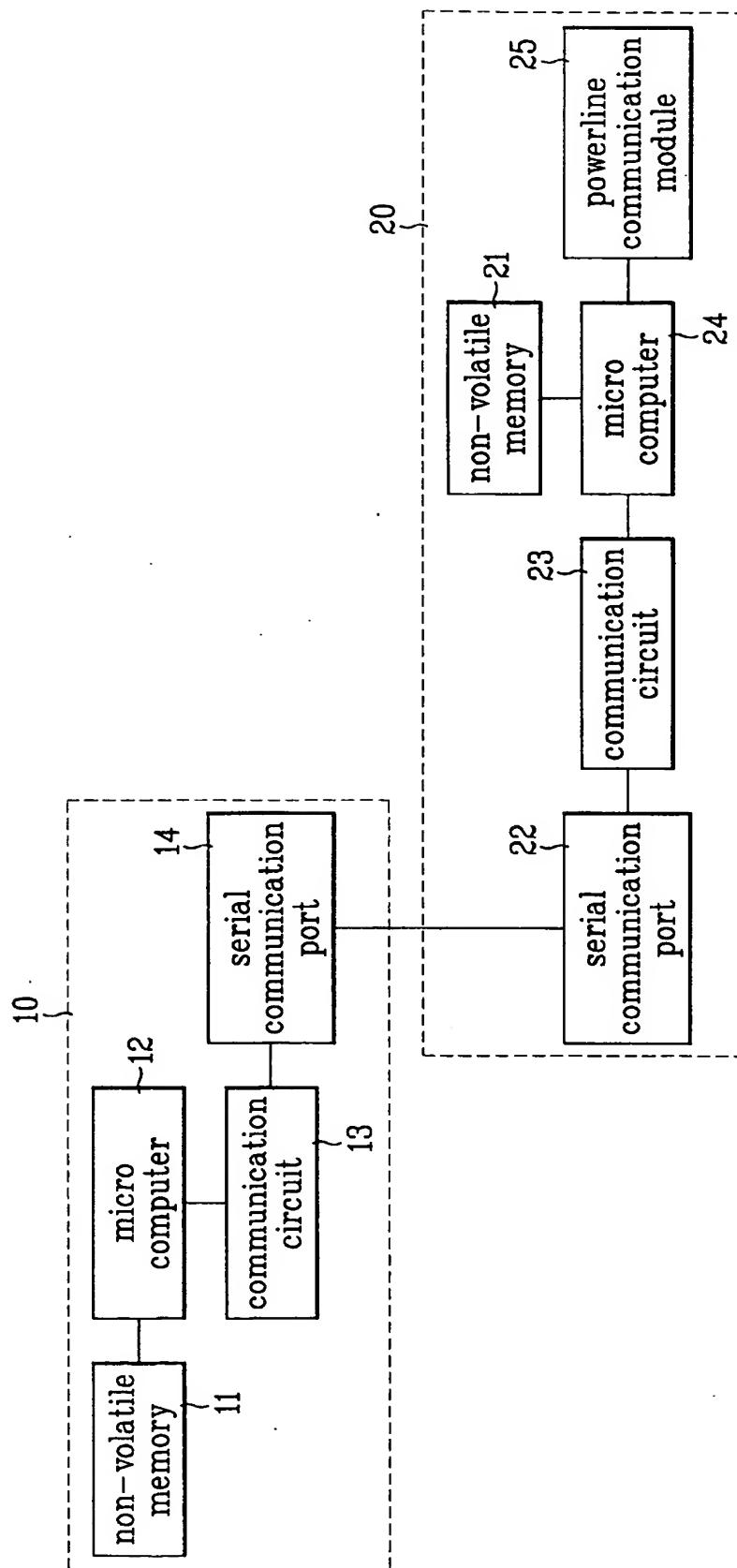
FIG. 3A

STX	receiver address	transmitter address	...	message to be transmitted	CRC	ETX

packet for transmission from an appliance
(appliance 1 => adapter 1)

FIG. 3B

House Code	STX	receiver address	transmitter address	...	message to be transmitted	CRC	ETX

packet for transmission on a powerline from an adapter
(adapter 1 => adapter 2)

FIG. 3C

STX	receiver address	transmitter address	...	message to be transmitted	CRC	ETX

packet for transmission from an adapter to an appliance
(adapter 2 => appliance 2)

FIG. 4

```
                    ┌──────────┐
                    │  start   │
                    └────┬─────┘
                         │
         ┌───────────────▼───────────────┐
         │        fit a new adapter        │──── S41
         └───────────────┬───────────────┘
                         │
         ┌───────────────▼───────────────┐
         │     put a house code setting    │──── S42
         │   program into operation in a PC │
         └───────────────┬───────────────┘
                         │
         ┌───────────────▼───────────────┐
         │      a user provides an adapter  │──── S43
         │          serial number          │
         └───────────────┬───────────────┘
                         │
         ┌───────────────▼───────────────┐
         │    make an automatic access to   │──── S44
         │     a house code managing site   │
         └───────────────┬───────────────┘
                         │
         ┌───────────────▼───────────────┐
         │   assign an exclusive house code │──── S45
         └───────────────┬───────────────┘
                         │
         ┌───────────────▼───────────────┐
         │       construct a packet for     │──── S46
         │        setting a house code      │
         └───────────────┬───────────────┘
                         │
         ┌───────────────▼───────────────┐
         │    transmit a packet to an adapter │──── S47
         └───────────────┬───────────────┘
                         │
                         ▼           S48
          no        ╱──────────────╲
      ┌─────────────  have           ╲
      │            ╲ 'ACK' received from the ╱
      │             ╲    adapter?    ╱
      │              ╲──────┬───────╱
      │                     │ yes
      │              ┌──────▼──────┐
      │              │     end     │
      │              └─────────────┘
      └──────────────────────────────
```
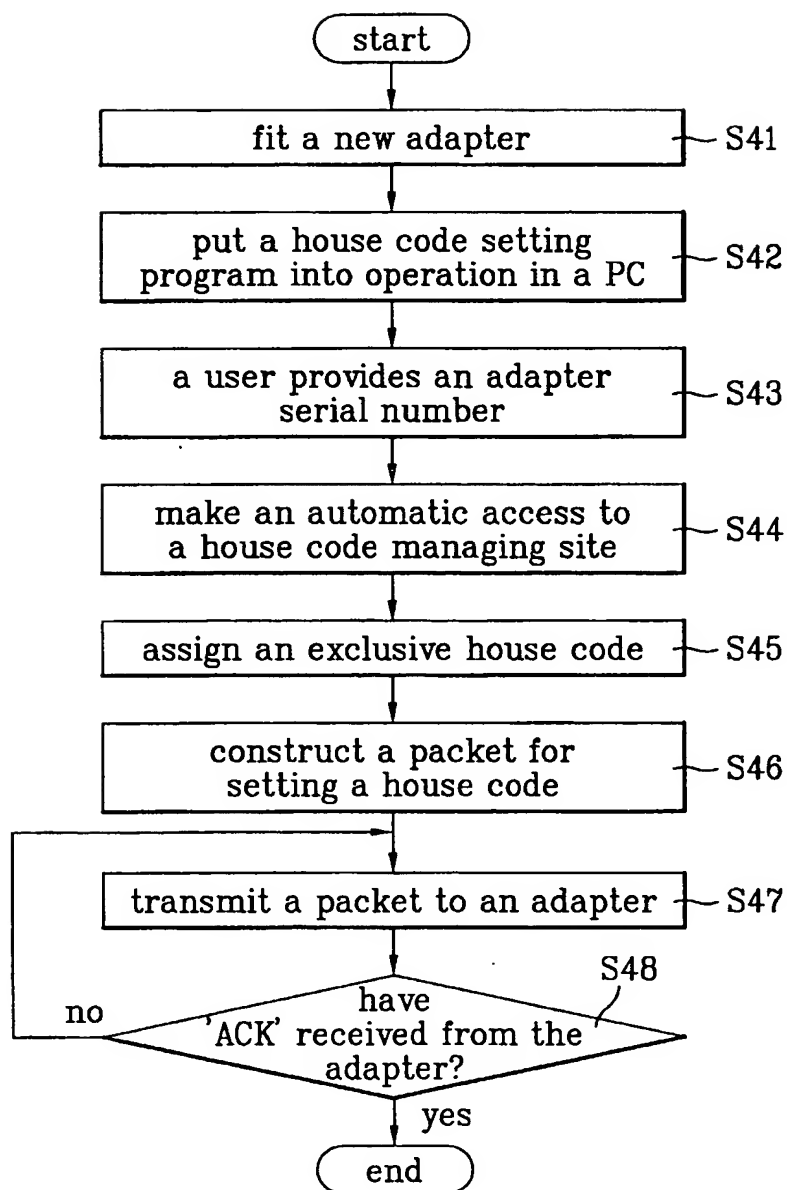
FIG. 5A

a serial number of a receiver adapter	a network address of a PC	House Code

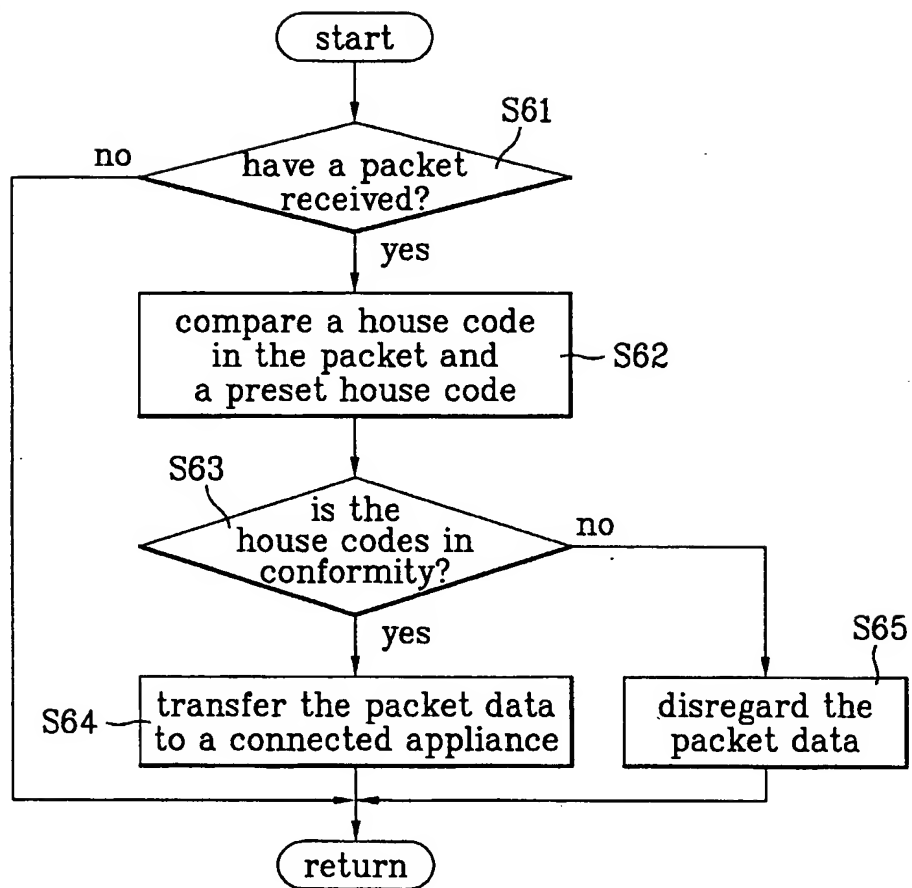packet for transmission from PC => adapter

FIG. 5B

a network address of a PC	a serial number of a receiver adapter	Ack

packet for transmission from adapter => PC

FIG. 6

```
                    ┌─────────┐
                    │  start  │
                    └────┬────┘
                         │
                         ▼
                    ╱──────────╲          S61
         no    ╱ have a packet  ╲
        ◄─────╲    received?    ╱
        │      ╲──────────╲────╱
        │              │ yes
        │              ▼
        │      ┌──────────────────┐
        │      │ compare a house code │
        │      │  in the packet and   │──── S62
        │      │  a preset house code │
        │      └──────────┬─────────┘
        │                 │
        │    S63          ▼
        │          ╱──────────────╲
        │         ╱    is the      ╲    no
        │        ╱  house codes in  ╲──────────┐
        │        ╲   conformity?    ╱          │
        │         ╲────────┬───────╱           │
        │              │ yes                   │
        │              ▼                       ▼       S65
        │  S64  ┌──────────────────┐   ┌──────────────┐
        │       │ transfer the packet data │   │ disregard the │
        │       │ to a connected appliance │   │  packet data  │
        │       └──────────┬─────────┘   └──────┬───────┘
        │                  │                     │
        └──────────────────┼─────────────────────┘
                           ▼
                    ┌──────────┐
                    │  return  │
                    └──────────┘
```

INTERNATIONAL SEARCH REPORT

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0120640 A2	03. 10. 1984	GB 8307149	15. 03. 1983

INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 H04L 12/28

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: H04L, H04M, G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean Patents and Applications for Inventions since 1975
Korean Utility Models and Applications for Utility Models since 1975

Electronic data base consulted during the interternational search (name of data base and, where practicable, search terms used)
IEL(IEEE/IEE Electronic Library)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0120640 A2 (EMI Ltd.) 10. March 1984: abstract, description, figures, claim 1-8	1-4
Y	Vehicular Technology Conference, 1999. VTC 1999-Fall.., IEEE VTS 50th, pp.507-501 , Vol.1, Nasu, T.;Nakagawa, M.; "Hybrid-coding and code-distinction for Wireless1394 Home-Link "	1-4
A	IEEE Transactions on Consumer Electronics, Vol. 46, Issue:4, Nov. 2000, pp.1161-1166, ISSN 0098-3063 Saito, T.; Tomoda, I.; Takabatake, Y.; Arni, J.; Teramoto, K., "Home gateway architecture and its implementation"	1-4

☐ Further documents are listed in the continuation of Box C.   ☒ See patent family annex.

* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevence "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevence; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevence; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art "&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
30 DECEMBER 2002 (30.12.2002)	30 DECEMBER 2002 (30.12.2002)

Name and mailing address of the ISA/KR	Authorized officer
Korean Intellectual Property Office 920 Dunsan-dong, Seo-gu, Daejeon 302-701, Republic of Korea Facsimile No. 82-42-472-7140	LEE, Saang Woong Telephone No. 82-42-481-5714

Form PCT/ISA/210 (second sheet) (July 1998)